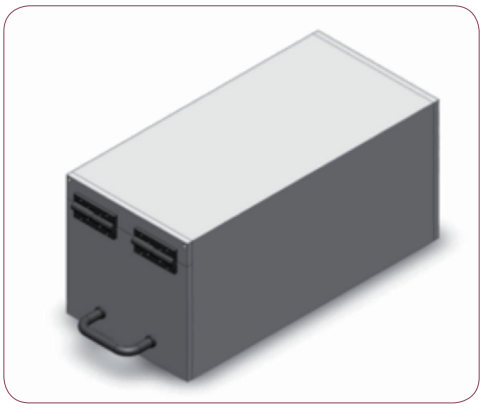
U-sterilize

Country of origin | Italy

Health problem addressed

One of the main problems of poorer countries is the lack of sterilization systems. Sterilization is important for everyday life in particular to have clean water, as well as to make medical treatments efficient and safe, avoiding viruses and bacteria transmission and proliferation. This system represents a power saving, easy to use and portable solution to sterilize surgical instruments and water.



Product description

Ultraviolet-C light at particular wavelengths (250-280 nm) can provide an efficient and economic means to create a portable, programmable and safe system to sterilize surgery and hospital tools, but also water and physiological solutions in suitable and compatible containers (neither polymeric nor organic material are compatible). This sterilizer is basically composed of an UVC lamp capable of inducing most of bacteria and virus death and degeneration. The inside of the case is in aluminium to maximize efficiency. It is possible to connect a control system by USB port which calculates the most efficient exposure time.

Developer's claims of product benefits

UVC systems have been largely developed to sterilize water. There are also some sterilizers for dentists and podiatrists, for example, because their tools are quite small. The strengths of this sterilizer are the optimization from the power consumption point of view and the possibility of using battery and solar energy. Furthermore it is completely open source and easily reproducible at low cost.

Suitability for low-resource settings

The sterilizer is designed to provide low energy consumption with the best compromise between efficacy and power efficiency. The control algorithm optimizes the exposition time to reach a good SAL (Sterility Assurance Level, typically 10-3 - 10-6) saving much energy. The use of aluminium for the internal case increases the efficiency by 70%.

The system can be equipped with solar panels and batteries in lieu of main power.

Operating steps

Without system control: open the case, put the object inside, close the door. After having plugged in the power supply, turn it on. Some standard exposure times are given. A homogeneous exposure needs to turn the system off and upside down the object. With system control: you can set some parameters; the display automatically shows the exposure time and turns on and off the lamp, indicating when eventually to turn the object.

Regulatory status

Still requires regulatory approval.

Future work and challenges

The University of Pisa is developing this sterilizer with a particular attention to the optimization of energy consumption to improve the efficiency of the system: future studies will be spent in finding energy autonomy solutions, using also natural and available forms of energy as well as solar and mechanical. Furthermore UVC diodes are now starting to be commercialized: these represent a very efficient system which will be able to drastically reduce power consumption, but in this moment they still are a research tool.

Use and maintenance

User: Can be operated by any trained personnel

Maintenance: Requires annual maintenance, which can be done on-site

Environment of use

Setting: Designed for use in indoor health care facilities.

Energy requirements: Requires a continuous power supply of 220v

Software requirements: This sterilizer is intended to be completely open source and easily reproducible, so that the system control has been implemented in C language with Arduino support, but it can identically be used with other platforms.

Product specifications

Weight (kg): 2

Dimensions: 240mm x 120mm x 120mm

Lifetime: 1 year

Retail price (USD): 300

Price of Consumables (USD): 30

Other features: The software, being open source, can be customized. For example it can be developed with sensors for Ozone and temperature control: these can easily be integrated in the system, intervening on the software too.

Year of commercialization: Still in Development

Currently sold in: Still in Development

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